

CLAIMS

What is claimed is:

1. **[Withdrawn]** A single use hypodermic syringe with a retracting needle system comprising:

a cylindrical body element for containing a fluid;

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and a pre-use and post-use position wherein the needle is retracted and contained completely within the body element;

a plunger rod reciprocally received into the body element forming a fluid chamber therebetween, and whereby positive and negative pressure forces are generated by adjustment of the plunger rod within the body element whereby fluid is drawn into, and expelled from, the body element through the hollow needle;

a retraction mechanism comprising:

the springs between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial pressure on the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial pressure of the springs;

at least one activating member within the needle holding member responding to positive fluid pressure within the fluid chamber to release the retaining member from the needle holding member;

whereby the needle is automatically deployed into the injecting position by depression of the plunger rod prior to drawing fluid into the fluid chamber and is automatically retracted within the body element at the completion of an injection stroke of the plunger rod and which retraction renders the syringe safe for handling and disposal.

2. **[Withdrawn]** The hypodermic syringe of claim 1 wherein said activating member comprises an activating ring with pistons attached cooperating with an activating release slide, whereby positive fluid pressure within the fluid chamber pushes the activating ring piston against the activating release slide which in turn releases the retaining clip from the needle holding member.

3. **[Withdrawn]** The hypodermic syringe of claim 1 wherein the springs are conical

helical springs.

4. **[Withdrawn]** The hypodermic syringe of claim 3 wherein the springs are twin conical helical springs.

5. **[Withdrawn]** The hypodermic syringe of claim 4 wherein the twin conical helical springs includes a spring separation member.

6. **[Withdrawn]** The hypodermic syringe of claim 1 wherein the springs are received between a pair of spring retaining cups.

7. **[Withdrawn]** The hypodermic syringe of claim 6 wherein one of spring retaining cups is integrally formed with the needle holding member.

8. **[Withdrawn]** The hypodermic syringe of claim 1 wherein a plurality of activation members are equidistantly spaced around the needle holding member, each activation member cooperating with a corresponding retaining member.

9. **[Withdrawn]** The hypodermic syringe of claim 8 wherein a slide member is located between each activation member and each corresponding retaining member.

10. **[Withdrawn]** A single use hypodermic syringe with a retracting needle system comprising:

a cylindrical body element for containing a fluid;

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and a pre-use and post-use position wherein the needle is retracted and contained completely within the body element;

a plunger rod reciprocally received into the body element forming a fluid chamber there between, and whereby positive and negative pressure forces are generated by adjustment of the plunger rod within the body element whereby fluid is drawn into, and expelled from, the body element through the hollow needle;

a retraction mechanism comprising:

the springs between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial force on the needle holding member, wherein the springs are twin conical helical springs and include a spring separation member and is received between a pair of spring retaining cups, both spring retaining cups, both

spring retaining cups being integrally formed with the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial force of the springs;

a plurality of activating members within the needle holding member equidistantly spaced around the needle holding member moulded on a ring, responding to positive fluid pressure within the fluid chamber to release a corresponding retaining member from the needle holding member, and a slide member located between each activation member and each corresponding retaining member;

whereby the needle is automatically deployed into the injecting position by depression of the plunger rod prior to drawing fluid into the fluid chamber and is automatically retracted within the body element at the completion of an injection stroke of the plunger rod and which retraction renders the syringe safe for handling and disposal.

11. **[Withdrawn]** A needle retraction mechanism for a single use hypodermic syringe having a cylindrical body element for containing a fluid and a plunger rod reciprocally received into the body element forming a fluid chamber therebetween, and whereby positive and negative pressure forces are generated by

adjustment of the plunger rod within the body element whereby fluid is drawn into, and expelled from, the cylindrical body element through the hollow needle,

comprising:

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and post-use position wherein the needle is retracted and contained completely within the body element;

the springs between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial pressure on the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial pressure of the springs;

at least one activating member within the needle holding member responding to positive fluid pressure within the fluid chamber to release the retaining member from the needle holding member.

12. [Withdrawn] The needle retraction mechanism of claim 11 wherein said

activating member comprises an activating ring piston cooperating with an activating release slide, whereby positive fluid pressure within the fluid chamber pushes the activating ring piston against the activating release slide which in turn releases the retaining clip from the needle holding member.

13. **[Withdrawn]** The needle retraction mechanism of claim 11 wherein the springs are conical helical springs.

14. **[Withdrawn]** The needle retraction mechanism of claim 13 wherein the springs are conical helical springs.

15. **[Withdrawn]** The needle retraction mechanism of claim 14 wherein the twin conical helical springs includes a spring separation member.

16. **[Withdrawn]** The needle retraction mechanism of claim 11 wherein the springs are received between a pair of spring retaining cups.

17. **[Withdrawn]** The needle retraction mechanism of claim 16 wherein both spring retaining cups are integrally formed with the needle holding member.

18. **[Withdrawn]** The retraction mechanism of claim 11 wherein a plurality of activation members are equidistantly spaced around the needle holding member moulded on a ring, the activation member cooperating with a corresponding retaining member.

19. **[Withdrawn]** The hypodermic syringe of claim 18 wherein a slide member is located between each activation member and each corresponding retaining member.

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NEW CLAIMS

What is claimed as the invention is:

20. [New Claim] A single use hypodermic syringe with a retracting needle system comprising:

a cylindrical body element for containing a fluid;

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and a pre-use and post-use position wherein the needle is retracted and contained completely within the body element;

a plunger rod reciprocally received into the body element forming a fluid chamber between the cylindrical body element, the plunger and the needle holding member,

and whereby positive and negative pressure forces are generated by adjustment of the plunger within the body element whereby fluid is drawn into, and expelled from, the body element through the hollow needle;

a retraction mechanism comprising:

a spring between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial pressure on the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial force of the spring;

at least one activating member within the needle holding member responding to positive fluid pressure within the fluid chamber to release the retaining member from the needle holding member;

whereby the needle is automatically deployed into the injecting position by depression of the plunger prior to drawing fluid into the fluid chamber and is automatically retracted within the body element at the completion of an injection stroke of the plunger and which retraction renders the syringe safe for handling and disposal.

21. **[New Claim]** The hypodermic syringe of claim 20 wherein said activating member comprises an activating ring with pistons attached cooperating with an activating release slide, whereby positive fluid pressure within the fluid chamber pushes the activating ring piston against the activating release slide which in turn

releases the retaining clip from the needle holding member.

22. **[New Claim]** The hypodermic syringe of claim 20 wherein the spring is conical helical spring.

23. **[New Claim]** The hypodermic syringe of claim 22 wherein the spring is a twin conical helical spring.

24. **[New Claim]** The hypodermic syringe of claim 23 wherein the twin conical helical spring includes a spring separation member.

25. **[New Claim]** The hypodermic syringe of claim 20 wherein the spring are received between a pair of spring retaining cups.

26. **[New Claim]** The hypodermic syringe of claim 25 wherein one of spring retaining cups is integrally formed with the needle holding member.

27. **[New Claim]** The hypodermic syringe of claim 20 wherein a plurality of activation members are equidistantly spaced around the needle holding member, each activation member cooperating with a corresponding retaining member.

28. **[New Claim]** The hypodermic syringe of claim 27 wherein a slide member is

located between each activation member and each corresponding retaining member.

29. [New Claim] The hypodermic syringe of claim 24 wherein the twin conical spring and the spring separation member cooperate to deflect the hollow needle from axial alignment when in the post-use position.

30. [New Claim] A single use hypodermic syringe with a retracting needle system comprising:

a cylindrical body element for containing a fluid;

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and a pre-use and post-use position wherein the needle is retracted and contained completely within the body element;

a plunger reciprocally received into the cylindrical body element forming a fluid chamber between the cylindrical body element and the needle holding member, and whereby positive and negative pressure forces are generated by adjustment of the plunger within the body element whereby fluid is drawn into, and expelled from, the cylindrical body element through the hollow needle;

a retraction mechanism comprising:

a spring between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial force on the needle holding member, wherein the spring is a twin conical helical springs and include a spring separation member and is received between a pair of spring retaining cups, both spring retaining cups being integrally formed with the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial force of the spring;

a plurality of activating members within the needle holding member equidistantly spaced around the needle holding member moulded on a ring, responding to positive fluid pressure within the fluid chamber to release a corresponding retaining member from the needle holding member, and a slide member located between each activation member and each corresponding retaining member;

whereby the needle is automatically deployed into the injecting position by depression of the plunger prior to drawing fluid into the fluid chamber and is automatically retracted within the cylindrical body element at the completion of an

injection stroke of the plunger and which retraction renders the syringe safe for handling and disposal.

31. **[New Claim]** A needle retraction mechanism for a single use hypodermic syringe having a cylindrical body element for containing a fluid and a plunger reciprocally received into the body element forming a fluid chamber between the cylindrical body element and the needle holding member, and whereby positive and negative pressure forces are generated by adjustment of the plunger within the cylindrical body element whereby fluid is drawn into, and expelled from, the cylindrical body element through the hollow needle, comprising:

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and post-use position wherein the needle is retracted and contained completely within the cylindrical body element;

a spring between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial force on the needle holding member;

at least one retaining member engaging the needle holding member and retaining

the needle holding member against the axial force of the spring;

at least one activating member within the needle holding member responding to positive fluid pressure within the fluid chamber to release the retaining member from the needle holding member comprising:

an activating ring piston cooperating with an activating release slide, whereby positive fluid pressure within the fluid chamber pushes the activating ring piston against the activating release slide which in turn releases the retaining clip from the needle holding member.

32. **[New Claim]** The needle retraction mechanism of claim 31 wherein the spring is a conical helical spring.

33. **[New Claim]** The needle retraction mechanism of claim 32 wherein the spring is a conical helical spring.

34. **[New Claim]** The needle retraction mechanism of claim 33 wherein the twin conical helical spring includes a spring separation member.

35. **[New Claim]** The needle retraction mechanism of claim 31 wherein the

spring is received between a pair of spring retaining cups.

36. **[New Claim]** The needle retraction mechanism of claim 35 wherein both spring retaining cups are integrally formed with the needle holding member.

37. **[New Claim]** The retraction mechanism of claim 31 wherein a plurality of activation members are equidistantly spaced around the needle holding member moulded on a ring, the activation member cooperating with a corresponding retaining member.

38. **[New Claim]** The needle retraction mechanism of claim 37 wherein a slide member is located between each activation member and each corresponding retaining member.

39. **[New Claim]** A needle retraction mechanism of claim 34 wherein the twin conical spring and the spring separation member cooperate to deflect the hollow needle from axial alignment when in the post-use position.

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